Litigation Search on Parent Patent 5,530,518 (see p 5)

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1. 2/19/1 (Item 1 from file: 351)

009560799 **Image available**
WPI Acc No: 1993-254346/199332
XRPX Acc No: N96-253166

Projection exposure appts. for mfr. of semiconductor IC's - has annular light source forming annular secondary light source and condenser condensing light beam on projection negative

Patent Assignee: NIKON CORP (NIKR)
Inventor: KAMEYAMA M; USHIDA K
Number of Countries: 002 Number of Patents: 003
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
JP 5175101	A	19930713	JP 91343601	A	19911225	199332	B
US 5530518	A	19960625	US 92991421	A	19921216	199631	
			US 93166153	A	19931214		
			US 94274369	A	19940713		
			US 94370216	A	19941207		
US 5576801	A	19961119	US 92991421	A	19921216	199701	
			US 93166153	A	19931214		
			US 94274369	A	19940713		
			US 94370216	A	19941207		
			US 95480863	A	19950607		

Priority Applications (No Type Date): JP 91343601 A 19911225
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
JP 5175101	A		5	H01L-021/027	
US 5530518	A		15	H01L-021/027	Cont of application US 92991421
					CIP of application US 93166153
					Cont of application US 94274369
US 5576801	A		15	G03B-027/42	Cont of application US 92991421
					CIP of application US 93166153
					Cont of application US 94274369
					Cont of application US 94370216

Abstract (Basic): JP 5175101 A
Dwg.1/6
US 5530518 A

The appts. includes an optical device for illuminating a projection negative and a projection optical device for projection-exposing the projection negative illuminated by the illuminating optical device onto a substrate. The illuminating optical device includes a light source device for supplying exposure light, an annular light source forming device for forming an annular sec. light source, which has a number of light source images, by the light from the light source device. A condenser condenses the light from the annular light source forming device on the projection negative.

The appts. satisfies the following condition: 1/3 at mostd1/d2at most 2/3 , where d1 is the inner dia. of the annular sec. light source, and d2 is the outer dia. of the annular sec. light source. The appts. also satisfies the following condition: 0.45at mostNA2/NA1at most0.8,

where NA1 is the numerical aperture of the projection optical device, and NA2 is the numerical aperture of the illuminating optical device determined by the outer dia. of the annular sec. light source.

ADVANTAGE - Has improved resolution.

Dwg.1/11

Abstract (Equivalent): US 5576801 A

A projection exposure apparatus including:

an illuminating optical system; and

a projection optical system,

said illuminating optical system including a light source, an optical integrator, a first annular stop, a second annular stop and a condenser optical system;

said projection optical system including an aperture stop;

light from said light source passing through said optical integrator, said condenser optical system, a projection negative and said projection optical system and onto a substrate;

said first and second annular stops satisfying the following condition:

1/3at mostd1/d2at most2/3

where d1 is an inner diameter of aperture portions of said annular stops and d2 is an outer diameter of aperture portions of said annular stops;

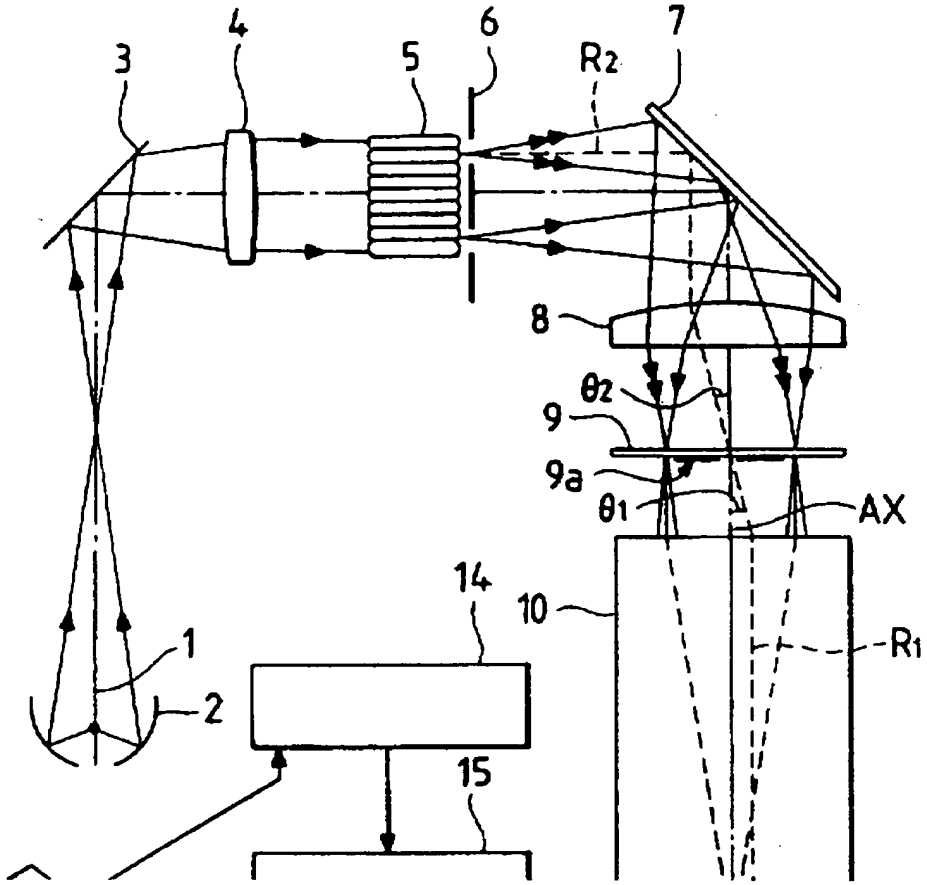
said first and second annular stops being selectively disposed at a position of an annular secondary light source comprising a plurality of light source images formed by said illuminating optical system; and

the aperture stop of said projection optical system and said first and second annular stops satisfying the following condition:

0.45at mostNA2/NA1at most0.8,

where NA1 is the numerical aperture of said projection optical system at a side of said projection negative, and NA2 is the numerical aperture of said illuminating optical system determined by an outer diameter of said annular secondary light source.

(Dwg.1/11)


3
4
5
6
7
R2
8
θ2
9
9a
θ1
AX
10
R1
14
1
2
15

Title Terms: PROJECT; EXPOSE; APPARATUS; MANUFACTURE; SEMICONDUCTOR; IC; ANNULAR; LIGHT; SOURCE; FORMING; ANNULAR; SECONDARY; LIGHT; SOURCE; CONDENSER; CONDENSATION; LIGHT; BEAM; PROJECT; NEGATIVE
Derwent Class: P82; P84; U11
International Patent Class (Main): G03B-027/42; H01L-021/027
International Patent Class (Additional): G03B-027/32; G03B-027/54; G03F-007/20
File Segment: EPI; EngPI
Manual Codes (EPI/S-X): U11-C04E1; U11-C15A

2.

2/19/2 (Item 2 from file: 345)

11268216
Basic Patent (No,Kind,Date): JP 5175101 A2 19930713

PATENT FAMILY:
JAPAN (JP)
Patent (No,Kind,Date): JP 5175101 A2 19930713
PROJECTING EXPOSURE DEVICE (English)
Patent Assignee: NIPPON KOGAKU KK
Author (Inventor): USHIDA KAZUO; KAMEYAMA MASAOMI
Priority (No,Kind,Date): JP 91343601 A 19911225
Applic (No,Kind,Date): JP 91343601 A 19911225
IPC: * H01L-021/027; G03B-027/32; G03F-007/20
Derwent WPI Acc No: ; G 93-254346
JAPIO Reference No: ; 170579E000065
Language of Document: Japanese

UNITED STATES OF AMERICA (US)
Patent (No,Kind,Date): US 5530518 A 19960625
PROJECTION EXPOSURE APPARATUS (English)
Patent Assignee: NIPPON KOGAKU KK (JP)
Author (Inventor): USHIDA KAZUO (JP); KAMEYAMA MASAOMI (JP)
Priority (No,Kind,Date): US 370216 A 19941207; JP 91343601 A 19911225; US 274369 B1 19940713; US 166153 B2 19931214; US 991421 B1 19921216
Applic (No,Kind,Date): US 370216 A 19941207
National Class: * 355053000; 355067000; 355071000
IPC: * H01L-021/027; G03F-007/20
Derwent WPI Acc No: * G 93-254346
JAPIO Reference No: * 170579E000065
Language of Document: English
Patent (No,Kind,Date): US 5576801 A 19961119
PROJECTION EXPOSURE APPARATUS (English)
Patent Assignee: NIPPON KOGAKU KK (JP)

Litigation Search on parent Patent No 5,530,518

Author (Inventor): USHIDA KAZUO (JP); KAMEYAMA MASAOMI (JP)
Priority (No,Kind,Date): US 480863 A 19950607; JP 91343601 A 19911225; US 370216 A1 19941207; US 274369 B1 19940713; US 166153 B2 19931214; US 991421 B1 19921216
Applic (No,Kind,Date): US 480863 A 19950607
National Class: * 355053000; 355067000
IPC: * G03B-027/42; G03B-027/54
Derwent WPI Acc No: * G 93-254346
JAPIO Reference No: * 170579E000065
Language of Document: English

UNITED STATES OF AMERICA (US)
Legal Status (No,Type,Date,Code,Text):

US 5530518	P	19911225	US AA	PRIORITY (PATENT)
			JP 91343601 A	19911225
US 5530518	P	19921216	US AA	PRIORITY
			US 991421 B1	19921216
US 5530518	P	19931214	US AA	PRIORITY
			US 166153 B2	19931214
US 5530518	P	19940713	US AA	PRIORITY
			US 274369 B1	19940713
US 5530518	P	19941207	US AE	APPLICATION DATA (PATENT)
			(APPL. DATA (PATENT))	
			US 370216 A	19941207
US 5530518	P	19960329	US AS02	ASSIGNMENT OF ASSIGNOR'S INTEREST
			NIKON CORPORATION 2-3, MARANOUCHI 3-CHOME, CHIYODA-KU TOKYO 100, JAPAN ; USHIDA, KAZUO : 19960321; KAMEYAMA, MASAOMI : 19960321	
US 5530518	P	19960625	US A	PATENT
US 5530518	P	19981027	US RF	REISSUE APPLICATION FILED
			(REISSUE APPL. FILED)	
			980624	
US 5530518	P	19990803	US RF	REISSUE APPLICATION FILED
			(REISSUE APPL. FILED)	
			19990525	
US 5576801	P	19911225	US AA	PRIORITY (PATENT)
			JP 91343601 A	19911225
US 5576801	P	19921216	US AA	PRIORITY
			US 991421 B1	19921216
US 5576801	P	19931214	US AA	PRIORITY
			US 166153 B2	19931214
US 5576801	P	19940713	US AA	PRIORITY
			US 274369 B1	19940713
US 5576801	P	19941207	US AA	PRIORITY
			US 370216 A1	19941207
US 5576801	P	19950607	US AE	APPLICATION DATA (PATENT)
			(APPL. DATA (PATENT))	
			US 480863 A	19950607
US 5576801	P	19961119	US A	PATENT

No litigation